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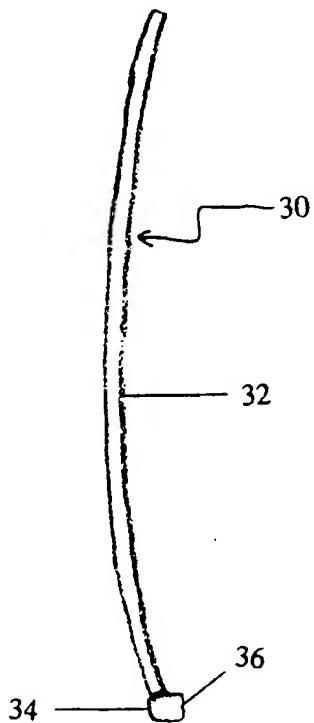
(72) Inventeur/Inventor:  
LORINT, George, CA

(73) Propriétaire/Owner:  
LORINT, George, CA

(74) Agent: BORDEN LADNER GERVAIS LLP

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(54) Title: ARCUATE SHAFT FOR SPORTING EQUIPMENT



(57) Abrégé/Abstract:

A hockey stick comprises a shaft, mating with a blade, with the shaft having an arcuate configuration, with the plane of curvature of the shaft being transverse to the plane of the blade. The curvature of the shaft extends for substantially the full length of the shaft. The radius of curvature of the shaft is approximately 10m to 50m. The curvature of the shaft provides improved hand positioning on the shaft, permitting improved puck handling characteristics, and also enhances the resiliency of the shaft for increased power when contacting the puck. A ringette stick, golf club and lacrosse stick also include the arcuate shaft of this general type.

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## ARCUATE SHAFT FOR SPORTING EQUIPMENT

### Field of the Invention

The present invention relates to hockey sticks, and in particular to hockey sticks having an improved shaft handle portion. The invention also relates to other sports implements characterized by an elongated shaft, including golf clubs and baseball bats.

### Background of the Invention

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Conventional hockey sticks comprise an elongated, straight handle or shaft, typically fabricated from wood, tubular metal or plastic. A curved blade is fastened to or is integral with the handle. The general configuration of hockey sticks has changed little over the years, although certain changes to the blade portion have been introduced, to impart a curvature or the like to the blade. Concerning the shaft or handle portion, there has been little change. It has been proposed within Published Canadian Application 2,179,329 (Fletcher) to provide an angled region at the upper end of the shaft, to provide an additional hand grip portion. As well, it is been proposed within U.S. Patent 5,853,338 (Ubriaco) to provide an offset region at the lower, blade region of the stick, for improvement of puck handling characteristics. These alterations have not seen a widespread introduction into the marketplace.

It will be further noted that the game of hockey is highly competitive, and players, even at the recreational level, constantly seek to obtain even slight advantages over their opponents. In this light, any improvement in a hockey stick which provides superior puck handling or other characteristics is highly desirable.

There exists essentially two requirements for hockey sticks. First, the stick must permit the player to handle a puck with a high degree of control and accuracy. This permits the player to control the puck with a high degree of precision while moving the puck along the ice, passing to other players and other like movements requiring a high degree of precision in the

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placement of the puck. Second, a high degree of power is required during shooting, for example when directing a puck towards the goal, particularly when the player is at some remove from the goal. In respect of both requirements, and in particular the first requirement, the player's hand position on the stick is important for maintaining precise control over the puck. Concerning the second requirement, an additional requirement of the hockey stick is a degree of resiliency. For example, it has been found that skilled hockey players when shooting a "slap shot" in fact permit the blade of the stick to contact the ice immediately prior to hitting the puck, thereby actually increasing the speed of the blade to a speed higher than that of the player's swing. This is a principle similar to that of a "driver" in golf, wherein resiliency of the handle results in a "sling shot" effect as the player swings the club through a full arc. Since a hockey stick is relatively light weight, particularly at its blade end, the striking of the stick on the ice achieves a similar effect.

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It is desirable to provide a hockey stick having improved puck handling and high speed puck shooting characteristics. I have found that at least one of these objectives may be achieved by providing a hockey stick having a handle portion with a unique configuration, as will be described and characterized in detail below.

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I have also found that the same invention may in other aspects comprise other sports equipment having an elongate handle, for example a "ringette" stick, which is closely related to a hockey stick but without the blade portion, a golf club, a baseball or softball bat and a lacrosse stick.

### **Summary of the Invention**

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Having regard to the objectives recited above, the present invention comprises in one aspect a hockey stick comprising of an elongate shaft portion and a generally conventional blade portion, the shaft portion being characterized by an arcuate or cambered configuration, wherein the shaft is bowed for substantially its entire length within a plane transverse to the plane of the blade, i.e., the arc extends to the left or right when the stick is in the normal play position. Preferably, the camber of the shaft resides in an arc of constant radius, the radius

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of curvature preferably falling within the range of 10m to 50m , and more preferably within the range of 15m to 25m .

Conveniently, the shaft may be formed from wood, laminated in the above arcuate configuration.

In a further aspect, the invention comprises a ringette stick, the shaft of which has the characteristics recited above.

10 In another aspect, the invention comprises a golf club, characterized by an arcuate handle, the arc extending substantially the full length of the shaft. The plane of curvature of the shaft is transverse to the striking surface of the club head. The radius of curvature of the shaft falls within the ranges recited above.

In another aspect, the invention comprises a lacrosse stick characterized by an elongate curved shaft and a basket at one end of the shaft. The plane of curvature of the shaft is transverse to the flat face of the basket.

20 In another aspect, the invention comprises a baseball or softball bat having an arcuate configuration extending substantially the length thereof.

Having thus generally characterized the invention, further aspects of the invention will be now set forth by way of a detailed description of preferred embodiments of the invention, including drawings thereof.

#### Brief Description of the Drawings

Figure 1 is a side elevational view of a hockey stick according to the present invention;

30 Figure 2 is a front view of the hockey stick of Figure 1, indicating the degree of curvature of the stick;

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Figure 3 is a front view of a "ringette" stick according to the present invention;

Figure 4 is a front view of a golf club according to the present invention;

Figure 5 is a front view of a lacrosse stick according to the present invention; and

Figure 6 is a side view of a baseball bat according to the present invention.

#### Detailed Description of the Preferred Embodiments

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Referring to Figures 1 and 2, a hockey stick 10 is shown, which embodies the present invention. The stick comprises an elongate shaft 12, which joins a conventional blade region 14. A bulged region 16 formed from tape or other hand grippable member may be placed at the upper end of the shaft to improve the user's hand grip.

The shaft 12 is characterized by an arcuate configuration, when seen front or back view, i.e., the view shown in Figure 2. The shaft 12 is thus bowed for substantially the entire length of the shaft, from the upper end to the junction with the blade portion 14. The curvature of the shaft lies on a plane generally transverse (i.e. orthogonal) to the plane of the blade, 20 whereby a player handling the stick would experience the bow extending to the left or right. For a left handed player, the arc of the shaft would place the apex of the arc to the left, when the stick is held in front of the player in a normal play position, and the reverse for a right handed player.

The radius of curvature of the shaft of the preferred embodiment is approximately 20m. Thus, for a conventional stick having a length of approximately 120cm, the center of the shaft is about 3.6cm displaced from the cord ("α") connecting the respective ends of the shaft.

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In the preferred version, the stick handle is fabricated from wood, which has been laminated to achieve the desired arcuate configuration. The shaft may also comprise any convenient

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material, such as tubular aluminum or other metal or plastic. The radius of curvature is selected to permit the user a more natural hand placement on the shaft when compared to a straight shaft.

In use, a hockey stick of the above description has achieved a statistically significant increase in puck speed in tests conducted in which a hockey player alternated between a conventional stick and a stick as described above. The test results are summarized below:

Puck Speed (mph)			
	Shot #	Conventional Stick	Arcuate Shaft Stick
10	1	70	74
	2	71	71
	3	69	73
	4	68	70
	5	70	72
	6	69	71
	7	69	74
	8	68	73
	9	68	72
	20	68	74

Referring to Figure 3, a ringette stick 20 is illustrated. A ringette stick is generally similar to a hockey stick, but in place of the blade portion, the stick terminates at its lower end in a small knob 22. In this embodiment, the shaft region 24 of the ringette stick is identical to that of the hockey stick described above.

Turning to Figure 4, a golf club 30 embodying the present invention is disclosed. The club consists of a shaft 32 and a head 34. The head is generally conventional and forms a "driver" type head having a flat face 36 for contacting the ball. The shaft 32 is arcuate in the same manner as described above in connection with a hockey stick. The plane of curvature of the shaft is transverse (orthogonal) to the front face of the head, and is curved for

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substantially its entire length. The radius of curvature is the same as that set out above in connection with the hockey stick embodiment or slightly reduced, e.g. within the range 5m to 50m and preferably between 10m and 20m. The shaft may be fabricated from tubular metal, or any other convenient construction.

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Figure 5 illustrates a lacrosse stick 40 according to the present invention. In this embodiment, the lacrosse stick comprises an elongate shaft 42, with a basket-like head 44 fastened to an end of the shaft. The shaft is arcuate, and has a radius of curvature as characterized above in connection with the hockey stick embodiment. The basket portion has a planar open front face 46. The plane of curvature of the shaft is orthogonal to the face of the head. The radius of curvature of the shaft is as described above in connection with the hockey stick. Conveniently, the shaft may be fabricated from laminated wood, or any other convenient material.

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Figure 6 illustrates a baseball or softball bat 50 according to the present invention. The bat 50 comprises a straight hand grip portion 52, merging with an arcuate shaft portion 54. The radius of curvature of the shaft 54 is within the ranges of the hockey stick shaft described above. In use, the bat 50 is gripped at the hand grip portion 52, and rotated such that the plane of curvature lies on the plane of swing of the bat, with the shaft curved convexly relative to the direction of swing, i.e., the respective ends of the shaft angle forwardly relative to the direction of swing.

Although the present invention has been described by way of preferred embodiments thereof, it will be apparent to a person skilled in the art to which this invention pertains, that departures from and variations to these embodiments may be made, while still remaining within the spirit and scope of the present invention, as the same is defined within the appended claims.

**CLAIMS:**

1. A golf club, comprising an elongate golf club shaft mating with a head, said head having a face for contacting a ball, characterized by said golf club shaft having a substantially arcuate configuration along generally the length thereof, the plane of curvature of said golf club shaft being generally orthogonal to the plane of said face, and the center of curvature of said shaft positioned in a plane behind the face of the head.
2. A golf club as defined in Claim 1, wherein the radius of curvature of said golf club shaft is substantially within the range of: 5m to 50m.
3. A golf club as defined in Claim 2, wherein the radius of curvature of said golf club shaft falls within the range of: 10m to 20m.
4. A golf club shaft for a golf club, having a substantially arcuate configuration, the arc thereof extending substantially the length of said golf club shaft, said golf club shaft terminating in a first end for attachment to a head having a face for contacting a ball, said face lying on a first plane, the plane of curvature of said golf club shaft being orthogonal to said first plane, and the center of curvature of said shaft positioned in a plane behind the face of the head.
5. A golf club shaft for a golf club as defined in Claim 4, having a radius of curvature generally between: 5m to 50m.
6. A golf club shaft for a golf club as defined in Claim 5, having a radius of curvature generally between: 10m to 20m.

FIGURE 2

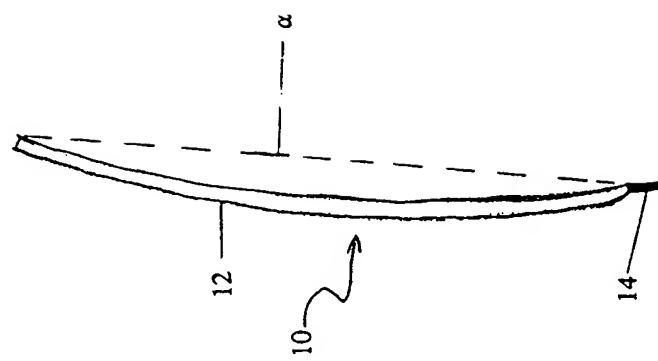


FIGURE 1

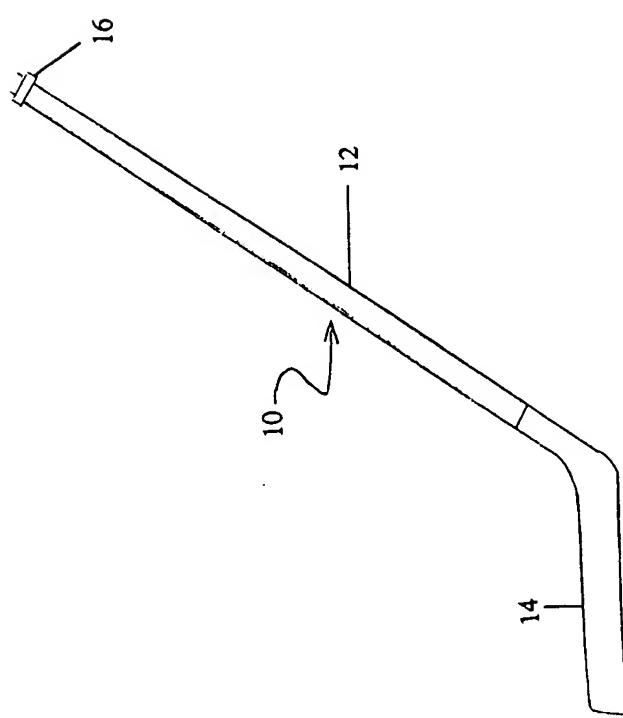


FIGURE 3

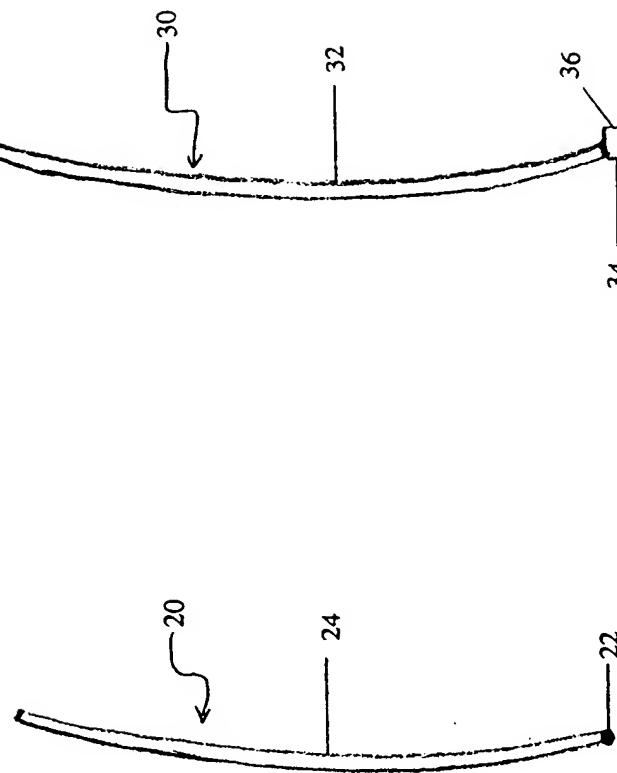


FIGURE 4

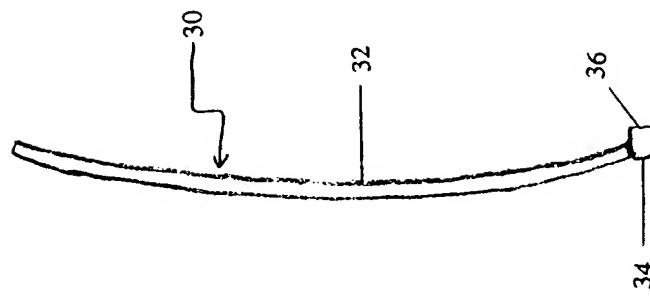


FIGURE 5

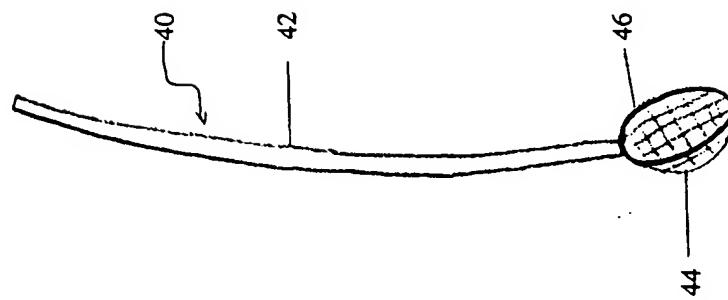


FIGURE 6

